



Nautical Engineering Queries

1. Auxiliary steam at full operating pressure is supplied direct from the boiler to the _____.

A. turbo-generator

Incorrect: A typical turbo-generator on a steam propulsion vessel is supplied by superheated, main steam.

B. main air ejectors

Incorrect: The main air ejector is supplied auxiliary steam at a reduced pressure via a reduced pressure regulator set to maintain a pressure no less than 150 psi.

C. distilling plant

Incorrect: The distilling plant feed water heater is usually supplied by low pressure extraction steam at approximately 10 psia.

D. soot blowers

Correct Answer: The soot blowers are directly supplied by full auxiliary steam pressure, which may require a pressure reduction according to its location within the tube bank by use of an orifice plate.

2. While vacuum is being raised on the main unit and the turbine warmed, condensate is re-circulated to the main condenser to _____.

Note: Condensate is re-circulated back to the main condenser to: 1) prevent the main condensate pump from running dry, which would lead to overheating, and uneven expansion of rotating components and eventual wear of close tolerance components. 2) aid in maintaining 10° F temperature differential of main condensate flowing through air ejector condensers, which assists in maintaining proper steam flow through air ejectors to continue removing non-condensable gases from the main condenser, and 3) assists in developing vacuum as a portion of the re-circulated condensate flashes upon entering the condenser, and as it condenses, the reduction in specific volume of the vapor enhances the developing vacuum.

A. ensure the condensation of the air ejector steam

Correct Answer: When raising vacuum, insufficient steam is exhausted to the main condenser. Hence, the quantity of condensate discharged by the main condensate pump through the air ejector condensers will be insufficient to condense the air ejector steam flow. If it were not for condensate re-circulation, the required steam flow rate through the air ejectors would decrease and diminish the ability of the air ejectors to extract non-condensable gases from the main condenser, and prevent vacuum from developing.

B. cool the main condenser shell for better vacuum

Incorrect: Re-circulating condensate does not cool the main condenser shell as shell temperature is a function of ambient engine room temperature and the corresponding saturation temperature to the vacuum maintained.

C. provide a condenser vacuum seal

Incorrect: The gland seal system prevents air from being drawn in along the turbine rotors through the use of low pressure steam supplied to the turbine rotor glands.

D. maintain a proper DC heater water level

Incorrect: The make-up feed and spill (dump) regulators provide the means to control the DC heater level.

3. In readying an auxiliary water-tube boiler for a routine hydrostatic test, which of the following procedures should be undertaken prior to filling the boiler with fresh water?

- A. The safety valve escape piping should be disconnected from the valve body and a blank inserted.
Incorrect: Designated safety valve gags should be used when a boiler is being hydrostatically tested. If a blank is to be used, it should be placed on the inlet side of the safety valve, and not on the outlet.
- B. The boiler vent valves should be opened.
Correct Answer: The vent valves should remain open while filling the boiler with water to ensure that all air is expelled. Once water exits the vent valves, the valves must be closed to ensure that the hydrostatic pressure will be maintained if all else is tight.
- C. All handhole/manhole covers should be tightened up as much as possible to preclude any leaks.
Incorrect: Handhole/manhole cover gaskets should be sufficiently tightened to ensure a leak-proof mating surface. Over-tightening could result in gasket failure and/or handhole damage.
- D. All of the above.
Incorrect: Choice "B" is the only correct answer.

4. The primary source of steam to the auxiliary exhaust system is typically supplied directly from _____.

- A. the main engine LP bleed
Incorrect: The LP bleed is a low pressure source of steam (approximately 10 psia) extracted off the main propulsion LP turbine primarily used to supply heat for the first stage main feedwater heater and the distiller salt water feed heater.
- B. turbine driven and reciprocating steam pumps
Correct Answer: The exhaust from the turbine driven and reciprocating steam pumps such as steam driven boiler feedwater, cargo, and ballast pumps are the main source of steam for the auxiliary exhaust system.
- C. the turbine gland exhaust system
Incorrect: The turbine gland exhaust system collects low pressure steam leak-off from the gland sealing system, and is evacuated by fan to the gland exhaust condenser.
- D. all of the above
Incorrect: Choice "B" is the only correct answer.